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FRONT COVER

Harvesting Coffee in Costa Rica

Harvests of Arabica coffee, which Americans prefer, have steadily dropped since the mid-1930's.

BACK COVER

The United States Is Going To Need More Coffee

United States coffee imports 20 years from now will have to be twice as large as they were 20 years ago if they are to satisfy the forecasted population of coffee drinkers.

NEWS NOTE

World Coffee Production, Supplies, and Requirements

As this issue of *Foreign Agriculture* went to press, Foreign Agriculture Service, through its weekly *Foreign Crops and Markets,* issued a summary of the world coffee situation, indicating that total supplies are at a low point in 1953-54—about 4 million bags (of 132.276 pounds each) less than the postwar average of 50.5 million bags.

World production of coffee in 1953-54 is estimated at 40.3 million bags, compared to 40.8 million in 1952-53 and 39.2 million in 1951-52. Brazilian production for 1953-54 is now given at 18.1 million bags—1.1 million less than the crop of 1952-53 and equal to the production of 1951-52.

World consumption of coffee remains relatively steady. Distribution last season—41.3 million bags—was 1.2 million higer than the average for the 6 years between 1947-48 and 1952-53. A distribution of the same quantity during the current season as last season depends on (1) the willingness of the producers to reduce the carry-over by another 1 million bags, (2) the final 1953-54 production in Brazil, and (3) the outlook for the 1954-55 crop.

That outlook indicates that the increases in production that have taken place in recent years in countries other than Brazil will continue. Additional new plantings have been and are being made in most countries, and it is such new plantings that have been the main contributors to additional supplies in the recent past. A considerable part of these new plantings have been in countries producing coffees that are more acceptable in European markets. To the extent that those coffees fill European needs, the Western Hemisphere coffees will be freed for United States needs.

Against this background of the current world coffee situation, the need for more efficient coffee production is clear. That need is discussed in the first article of this issue of *Foreign Agriculture.*

Credit for photos is given as follows: pp. 52-54, Gideon Hadary; p. 56, *The Land*; p. 59, Ralph S. Yohe.

FOREIGN AGRICULTURE — ALICE FRAY NELSON, EDITOR

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World's Need for More Efficient Coffee Production

by CLAUD L. HORN

If the United States farmer were to produce corn and wheat by methods as old as those in use by the world's coffee farmer, he would have to go back before the days of hybrid corn, back even before the days of Cyrus McCormick and the reaper.

For the amazing fact is this, that in a day that prides itself on improved production of food, fiber, and other agricultural goods, coffee production is still going on in the same old way, without any significant increase in productivity per man-hour or per acre—the two measures of progress with any crop.

The world coffee crop was even less last year than it was 20 years ago—5.1 billion pounds instead of 5.4 billion—and this in the face of a current coffee consumption of 5.3 billion pounds. To put it flatly, coffee is being underproduced.

The soundest way of increasing production is to increase efficiency, to turn out more per tree, per laborer, per acre. But for generations that way has been getting only secondary attention in coffee-producing countries, and coffee as a crop has generally been permitted to become a victim of circumstances instead of being adapted to the unfavorable features of its environment, or otherwise being freed from the effect of those features.

It is only fair to say, however, that one of the reasons for this backwardness is the fact that underproduction of coffee is a fairly new problem, not more than ten years old. Before 1944 coffee was being *over*produced. In the 1930's and even before, harvests were exceeding consumption, and stocks were piling up in the coffee countries, principally in Brazil, the world's biggest producer. Under such circumstances it was only natural that increases in productivity should not be encouraged.

Nevertheless it is to this lack of technological improvement that we now owe much of our coffee shortage. If there is any consolation to be had from this sorry fact, it is that the field for development is wide open and offers endless opportunity for progress.

Labor efficiency in coffee production has not increased over the years. Mechanization of various processes is almost unheard-of in many areas; and harvesting and marketing methods are still crude. Records kept by the coffee industry in one part of Brazil, for example, show that the output per worker is still about the same as it was 100 years ago. Such a fact is sharpened by a contrasting one: In the United States the average farm worker, for every 100 pounds of crop he turned out in 1935, turned out 181 pounds in 1950—an increase of 81 percent in only 15 years.

Much of our own farmers' high productivity traces right back to the ranks of scientists, who have bred rust out of wheat, high yield into corn, disease resistance into alfalfa, and size into blueberries; found fiber in corn kernels, resins in soybeans, and solvent in oat hulls; taught the cotton farmer how to keep the boll weevil out of his fields and the apple grower how to control the coddling moth.

Coffee has not had such boosts from science. Only a little work has been done to breed improved varieties. Even the botanical classification of existing species and varieties is still in disorder; and not much is known about the influence of heredity in the coffee plant. In Latin America some devoted scientists are trying to improve plant selection and breeding; but they are limited by lack of facilities and their own small number. Not many of the improvements they have thus far brought about have yet found their way into the fields of growers; and as a result most of the bearing trees are only the ordinary direct progeny of those first trees that entered the Americas back in the early 1700's.

Many of the destructive diseases and insects that cut into coffee crops might have been controlled long ago had more been known about this matter of heredity, and about the resistance of different species and varieties to the various plagues. As things stand now, however, diseases and insects

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in the Western Hemisphere alone reduce coffee crops by 10 and 15 percent, losing the industry between 300 million and 500 million pounds a year.

Cultural methods for coffee have had so little scientific work done on them that there still is no real knowledge about such commonplaces as how to plant a tree, how to fertilize it, and how to prune it.

Against the background of this more or less static situation, production costs have risen sharply; labor, though still not well paid, has greatly increased in cost; interest rates are higher; imported equipment is dearer; and taxes have risen considerably. The end result is that even with today's high prices the coffee farmer is not making the fabulous profits that some of us may imagine. In fact, in some countries there is not enough profit in coffee to attract the small farmer at all.

Coffee cultivation has remained in its backward state chiefly because the crop has never undergone a thorough industry-wide study by enough competent scientists with facilities for the job. Many growers are comparatively isolated by poor communication systems and have had few opportunities to receive technical training or even advice. Schools for training agricultural workers are few. In many areas growers have not had recourse to effective credit systems. Government revenues from coffee have had to be distributed over so many functions that the share remaining for improvement of the crop has not been enough. And only recently have the coffee drinkers in the United States been aroused enough to ask their government to look into the matter.

The gap between production and consumption first appeared in 1944 and has been widening ever since, with prices rising to match it. Until 1949 the difference was made up from stocks that had accumulated in Brazil during the 1930's; but by 1949 those stocks were virtually depleted. Ever since, we have been leading a hand-to-mouth existence as far as coffee is concerned, with nothing but the current crop to fall back on.

The price increases in the 1940's, however, did not seem to daunt the coffee drinker; and consumption continued its upward trend. Brazil—we single out that country because it is well established as the world's largest producer—began extensive plantings again, thus reversing the policy of restraint and retrenchment it had exercised in coffee growing ever since the depression of the 1930's.

But in the interim some things had happened that made it not so easy to take up coffee promoting exactly where it had been left off. In the first place, laborers had migrated from the great old coffee areas to areas where industrial enterprises offered more remunerative work; and the phenomenal growth of cities during that time had raised the price of labor far beyond what it had once been in the coffee plantations. Besides, many of the old coffee lands, worn out by the crop, had been either abandoned or turned to other agricultural uses. For these reasons the new plantings came to be made farther south in Brazil, where the climate is more temperate and where killing frosts sometimes occur.

A coffee tree has to be about 5 years old before it begins to produce for market. By 1953, therefore, the first of Brazil's new plantings were about to add something to the world's supply. Optimism was high about the future: each year new plantings would be coming into production; each year each young producing tree would be yielding a larger crop than it had the year before, for a coffee tree is most productive between the ages of 8 and 20 years.

But on the crest of this rising wave, in July 1953, a severe frost struck most of the new coffee plantings. It destroyed much coffee on the trees; some reports say more than ⅔ billion pounds, nearly enough to make up one-fourth of a whole year's imports into the United States. Even worse are the reports that it killed to the ground 80 percent of the trees younger than 3 years.

Now it looks as if things will have to be worse before they can be better. Even before the frost, the number of coffee trees in Brazil had not recovered substantially from the drop in the 1930's: in 1933 Brazil had had nearly 3 billion trees; in 1942, 2.3 billion; in 1951, 2.4 billion. Besides, the largest percent of the producing trees are in the over-20-years-old group, well past the peak of productivity; and it will be some years before there is again a majority in the most fruitful age bracket, as there was, for example, in 1942. Even if unprecedented numbers of trees are planted now, it will take years before they can do the consumer any good. Certainly the world coffee market today faces the most serious deficit in modern history.

We would not so much concern ourselves over the current shortage if the coffee-drinking population had reached an even level and there was promise of its staying there. Actually, nothing of the sort is in prospect.

In the United States, for example, where more coffee is consumed than in all the rest of the world, the coffee-drinking population—assuming that it consists of persons older than 15 years—has grown steadily in the last 30 years. Besides, each of these persons is drinking more coffee; 20 years ago per capita consumption was 19 pounds per year; today it is more than 24—a development all the more significant because it has occurred in the face of rising prices.

Twenty years from now, say in 1975, we will probably be counting our coffee drinkers at 154 million. By that time the unusually high birthrate of the forties and early fifties will have transformed itself into a reenforcement of the coffee-drinking ranks—that is, if the coming generation gets a chance to develop its taste for the beverage. At the same time, the old coffee drinkers will not have dropped out as fast as they once did: people are living longer. By 1975, then, even if each of us drinks no more coffee than we do now, our coffee requirements may well be close to 3.8 billion pounds.

To this growing demand in the United States we must add the growing demand in Western Europe, which before the war ran almost neck-and-neck with us as a coffee market. Although in the first post war years Europe kept its coffee imports down, it is now buying more freely and will probably match us again. Other countries, too, among them the producing countries, may be expected to consume more coffee as they develop economically.

In the aggregate the immediate prospect of an adequate supply is dark. But here and there are bright spots. In both hemispheres groups of scientists and their helpers, most of them working in isolated areas with limited facilities, are forming a nucleus around which an adequate program could be built. In several countries government agricultural experiment stations and extension workers are giving the problem their attention. Brazil, for instance, is developing plans to arrest the decline of the older coffee plantations by increasing irrigation and fertilization and breeding higher yielding varieties and is outlining a program to combat the broca, an insect that is ravaging the plantings in the east-

How can the coffee farmer increase the productivity of his plantings? The answer lies in an all-out drive to develop new techniques and to get them into practice.

ern part of the country. In Puerto Rico, plant-selection work has resulted in a variety of coffee that is significantly higher yielding than the country's established commercial varieties. Now and then a commercial organization, alert to the dangers of ignorance, sends promising young men to a university for training in science.

Even international programs, such as those sponsored by the Food and Agriculture Organization of the United Nations and the technical cooperation program of the United States, have given some assistance to the various groups interested in improving coffee culture. Under the United States program, for instance, soil researchers have discovered the minor-element deficiencies in the soils of Costa Rica; and a pathologist and horticulturist have traveled through all the coffee-growing world to study coffee's resistance to the deadly Hemileia rust, which has practically wiped out the fine Arabica plantings of Africa and the Orient and is a constant threat to the Americas. This particular effort has yielded more than information: it has brought to this side of the world plant materials from more than 100 kinds of coffee. These have been propagated under quarantine by the United States Department of Agriculture; and the young disease-free plants have been shipped to 5 experimental stations in Latin America for further study and for use in plant-breeding programs.

All these efforts toward scientific improvement are valiant; but experience with similar problems in the United States tells us that the magnitude of these efforts is entirely unrealistic in relation to the development job that is required. Perhaps representative of the slight attention that has been paid to the technology of coffee production is the fact that although 262 full-time United States specialists are now in Latin America giving technical assistance in agriculture and natural resources, the effort they are devoting to coffee improvement is almost negligible.

Nothing less than a concerted international effort, one that engages the support of both producing and consuming interests, can efficiently apply on a wide scale the techniques of scientific research to coffee production. Two recent events attest to the general awakening to the true nature of the problem. The first occurred in Havana, Cuba, a year ago; the second in San José, Costa Rica, last fall.

In Havana, in March 1953, the Federación Cafetelera Centro América-México-El Caribe (FEDECAME) held its sixth congress and approved in principle a proposal by the delegation from El Salvador. This proposal called for a Latin American Foundation for Research on Coffee and the Coffee Industry. The plan was a bold one, suggesting a trust fund of $13 million to $26 million, to be established either through a tax on every bag of coffee or by subscription fees. This fund would be used for such activities as (1) conducting fundamental studies on coffee production and making results available to all growers, (2) making special studies for areas with peculiar problems, (3) promoting interchange of coffee scientists and technicians among all member countries, (4) endowing institutions or qualified individuals to study coffee problems, (5) equipping a laboratory to explore industrial possibilities of coffee, and (6) studying markets and consumption.

A few months later, in September, a Coffee Round Table at San José was attended by leading coffee growers and scientists from most of the American coffee countries. These men, keenly aware that only by sharing in an international effort could they best serve their own countries, not only underwrote the idea of the Havana proposal but came up with some suggestions of their own, among them the creation of a Center for the Exchange of Technical Information on Coffee, to operate within the framework of the Inter-American Institute of Agricultural Sciences in Costa Rica. It would be charged with coordinating the work of technical organizations in the producing countries, avoiding duplication of effort, promoting exchange of material and personnel, and granting scholarships.

Never before has such interest been shown in the possibilities of an all-out research effort. Research, of course, is a long-term proposition, especially when it involves a slow-growing creation like a tree, and requires a particular brand of patience, persistence, and devotion. For that, however, we must look beyond the international organization and will find it where it has always been—in the individual scientist in the laboratory and the research station, and in the worker in the field.

What is needed now is a consolidating and a mobilizing of effort so that the many trained individuals in this important field can be put to work to help solve the problem, with its many implications for consumers, producers, and international trade.

Agricultural Products in United States Foreign Trade*

The many agricultural products entering United States foreign trade may be divided into two broad categories.

(A) Commodities commercially produced on United States farms or directly interchangeable with such commodities.

(B) Commodities not commercially produced on United States farms nor directly interchangeable with commodities produced domestically.

The first of these categories is of most importance in the marketing of United States agricultural products. In this category, we have distinguished four main groups of commodities.

1. Commodities in which the United States is about self-sufficient and of which both exports and imports are relatively unimportant;

2. Commodities of which the United States is traditionally a net exporter because production exceeds domestic consumption;

3. Commodities of which United States production is less than consumption and imports supplement domestic production;

4. Commodities produced only abroad but directly interchangeable with commodities produced on United States farms.

The relative importance of these different groups to the producer and trader are indicated in table 1, which shows that in 1952, for about two-thirds of the commercial output of United States farms, the value of exports and imports was less than 5 percent of cash farm receipts.[1] In this broad area of production, therefore, the United States is largely self-sufficient.

Commodities for which, as a group, exports are important account for about 31 percent of cash farm receipts. This group of commodities provides nearly 90 percent of total United States agricultural exports.

Domestically produced commodities for which as a group there is a major import balance account for 3 percent of cash farm receipts. Such imports including imports of commodities that are directly

* Prepared in Foreign Service and Trade Programs, FAS.

[1] It should be noted that the value of cash farm receipts as used in this article is not directly comparable with the value of exports and imports, since the latter include all marketing costs. The comparison is useful, however, as it indicates relative magnitude of values.

TABLE 1.—*Agricultural products in United States foreign trade, 1952*

[In million dollars]

Item	Cash farm receipts [1]	Exports [2]	Imports [2]
A. Commodities commercially produced on United States farms or directly interchangeable with such commodities:			
1. Exports and imports relatively small	21,286	297	468
2. Exports substantially larger than imports	10,028	3,037	311
3. Imports substantially larger than exports	842	47	941
4. Imports directly interchangeable with United States produced commodities		25	182
Total	32,156	[3] 3,418	1,902
B. Commodities not commercially produced on United States farms and not directly interchangeable therewith		9	2,616
Total all commodities	32,156	3,427	4,518

[1] Continental United States only. Not including government payments.

[2] Including trade of United States territories with foreign countries but excluding shipments between the continental United States and these territories. Trade data include all agricultural commodities, whether in raw or processed form.

[3] Including exports of food parcels and minor items not classified above.

interchangeable with those produced on United States farms make up 25 percent of total agricultural imports.

The remainder of our foreign trade in agricultural products falls into the second category; that is, commodities that are not commercially produced in the United States and are not directly interchangeable therewith. This category accounts for approximately 60 percent of United States agricultural imports.

Commodities commercially produced on United States farms or directly interchangeable therewith.

1. Exports and imports relatively small. About two-thirds of United States cash farm income derives from the output of livestock, dairy, and poultry producers, truck farmers, horticulturalists, peanut growers, and other farmers whose main market is the American consumer. While up to 10 percent of both agricultural exports and imports consist of these products, exports and imports for the various commodity groups vary from under 1 percent to 5 percent of cash farm receipts.

In 1952 the bulk of exports in this grouping consisted of (value in million dollars) animal products including meat (40); cattle hides (11); casings (10); dairy products, mainly condensed, evaporated, and dried milk (56); fresh eggs (19); fresh and canned vegetables (61); mixed feeds (7); cottonseed oil (14); and peanut oil (3). On the import side the major items were live cattle (14) and animal products including beef and veal (73); hams, shoulders, and bacon (47); goat, lamb, and other hides and skins (56); feathers (24); bristles (25); dairy products, mainly foreign-type cheeses (21) and whole milk (9); fresh tomatoes (15); flower bulbs (12); and miscellaneous feeds such as screenings (6) and dried beet pulp (5). In the case of fresh vegetables, seasonal across-the-border movements account for the bulk of the trade. In the case of butter, certain cheeses directly competitive with domestic cheeses, and dried milk products imports are currently limited by quota.

2. Exports substantially larger than imports. The remainder of United States cash farm receipts derives largely from commodities for which exports are substantially larger than imports. Such exports, including processed products, made up 89 percent of total United States agricultural exports in 1952. On the other hand, imports of this group of commodities constituted 7 percent of total agricultural

TABLE 2.—*Trade in domestically produced commodities for which the value of exports and imports is under 5 percent of cash farm receipts, 1952*

[In million dollars]

Commodity or commodity group	Cash farm receipts [1]	Exports [2]	Imports [2]
Cattle and other animals, meat and miscellaneous products	9,775	84	286
Dairy products	4,554	73	45
Poultry, eggs, and products	3,444	29	29
Vegetables and preparations	1,882	76	54
Greenhouse and nursery products	596	4	15
Cottonseed	390	17	15
Peanuts	144	3	1
Hay and miscellaneous feeds and fodder	376	9	17
Berries	125	2	6
Total	21,286	297	468

[1] Continental United States only. Not including government payments.

[2] Including trade of United States territories with foreign countries but excluding shipments between the continental United States and these territories. Trade data include all agricultural commodities, whether in raw or processed form.

imports and were equal to one-tenth of the exports listed in table 3. For some of these commodities—namely wheat, cotton, rice, and peanuts, peanut oil, and flaxseed and linseed oil—imports into the United States are under import control.

For most grains, cotton, and tobacco the export market is vital for American producers; more than 25 percent of cash farm receipts are derived from exports. More than three-fourths of total United States agricultural exports, in terms of value, consists of the commodities in this grouping. The specific importance of the export market for individual commodities can be measured by comparing foreign with domestic marketings. Such a comparison for 1952 shows that for rice the foreign market has been more important than the domestic; in the case of wheat and flour for human consumption the ratio between domestic and foreign marketing was about 5 to 4; for flue-cured tobacco, our principal export type, and for cotton it was about 2 to 1.

In terms of value (in million dollars) major individual items exported in 1952 were wheat (841), wheat flour (100), raw cotton (862), flue-cured tobacco (200), lard (86), tallow (49), milled rice (153), barley (62), grain sorghums (84), rye (10), and hops (8). The important import items were feed wheat (50), wheat for milling in bond and

export (17), long staple cotton (27), oriental (50) and cigar tobacco (31), and barley (26).

In relation to domestic production, imports of cotton equalled less than 2 percent of domestic production, of both wheat and tobacco about 5 percent. Although its imports of tobacco are small in relation to domestic production, the United States is, through its imports for blending and cigars, the world's third largest tobacco importer at the same time that it is the world's largest exporter. For some other export commodities and their products such as barley, rye, and hops, imports amounted to about 50 percent of exports.

For an additional group of commodities, representing 14 percent of United States agricultural exports in 1952, exports are somewhat less important as a direct source of cash income to the American farmer. Many of these commodities are exported in processed form, and thus at a value substantially above the farm value. In 1952 the following percentages of the domestic production of individual commodities in this group were exported: plums and prunes 20, soybeans 16, oranges and grapefruit 9, flaxseed, pears, and apricots 5, corn 4, and apples 3.

In terms of value (in million dollars) the major individual exports in this group were corn (191), soybeans (72) and soybean oil (30), flaxseed (9), dried beans (26) and peas (5), dried prunes (11), fresh oranges (28), and grapefruit (5), fresh apples and pears (10), canned fruits (21), and citrus and other juices (20). Individual imports assigned to this group include corn (2), soybean and linseed cake and meal (6), apples (5), and prune juice (3). Imports are relatively high in comparison to exports for grapes and raisins because of the inclusion of wines and champagne valued at $18 million in the imports; exports on the other hand consisted of fruit—grapes totaling $10 million and raisins, $18 million.

3. Imports substantially larger than exports. About 3 percent of United States cash farm receipts derives from commodities the imports of which are substantially in excess of exports and in some cases of domestic production. In 1952 the value of imports of this group of commodities constituted

TABLE 3.—*Trade in domestically produced commodities for which the value of exports is more than 5 percent of cash farm receipts and exports are substantially larger than imports, 1952*

[In million dollars]

Commodity group	Cash farm receipts [1]	Exports [2]	Imports [2]
Exports more than 25 percent of cash farm receipts:			
Wheat (including flour)	2,148	950	94
Cotton and linters	2,609	874	41
Tobacco	1,086	246	81
Lard, tallow, and other animal fats and oil	450	147	2
Rice	301	157	1
Barley	180	77	36
Grain sorghums	97	84	
Rye	20	10	4
Hops	24	8	4
Essential and distilled oils	14	7	1
Total	6,929	2,560	264
Exports 10 to 25 percent of cash farm receipts:			
Corn	1,159	202	4
Soybeans	778	104	4
Flaxseed	118	12	3
Deciduous fruits	467	38	8
Citrus fruits	258	47	2
Dried peas and beans	145	31	2
Grapes, raisins, wines, and other products thereof	124	28	20
Plums and prunes	50	15	4
Total	3,099	477	47
Grand total	10,028	3,037	311

[1] Continental United States only. Not including government payments.

[2] Including trade of United States territories with foreign countries but excluding shipments between the continental United States and these territories. Trade data include all agricultural commodities, whether in raw or processed form.

21 percent of total agricultural imports. The major items (value in million dollars) were sugar and molasses for which domestic production and imports are regulated by quotas (471), apparel wool (299), oats (55), olives and olive oil (35), field and grass seeds (21), canned pineapples (11), and dried coconut meat (10). About 1½ percent of total

TABLE 4.—*Trade in domestically produced commodities the imports of which are more than 5 percent of cash farm receipts and substantially larger than exports, 1952*

[In million dollars]

Commodity group	Cash farm receipts [1]	Exports [2]	Imports [2]
Sugar and molasses and related products	[3] 183	21	471
Apparel wool	130	(4)	299
Tung nuts	10	(4)	11
Olives	6	1	35
Pineapple and miscellaneous fruits, and spices	[5] 11	10	34
Oats	243	7	56
Field and grass seeds	165	3	21
Edible tree nuts (domestic type)	85	4	10
Figs and dates	9	1	4
Total	842	47	941

[1] Continental United States only. Not including government payments.

[2] Including trade of United States territories with foreign countries but excluding shipments between the continental United States and these territories. Trade data include all agricultural commodities, whether in raw or processed form.

[3] Total United States production, including that of United States territories, was valued at $500 million in 1952.

[4] Less than $500.

[5] Total United States production of pineapples in the territories was valued at approximately $100 million in 1952.

TABLE 5.—*Trade in commodities the imports of which are interchangeable with United States products, 1952*

[In million dollars]

Commodity group	Exports [1]	Imports [1]
Oilseeds and products not elsewhere listed [2]	24	118
Carnauba and other waxes	1	23
Vegetable fibers other than cotton		14
Edible tree nuts (foreign type)		27
Total	25	182

[1] Including trade of United States territories with foreign countries but excluding shipments between the continental United States and these territories.

[2] Exports include mainly processed products based on imported raw materials or not identifiable as to origin.

agricultural exports fall into this group, the main item being sugar and related products, valued at $21 million.

4. **Imports interchangeable with United States products.** Imports also exceed exports for commodities that while not produced in the United States or produced in very small measure are directly interchangeable with domestically produced commodities. Such commodities provide 4 percent of United States agricultural imports. In 1952 the important items in terms of value (in million dollars) were castor beans and oil (37), copra and coconut oil meal and cake (59), cashew nuts (19), carnauba and other vegetable waxes (23), jute (11), and brazil nuts (6).

Exports in this grouping consist largely of miscellaneous oilseeds and vegetable oil products made from both domestic and imported raw materials, which were valued at $24 million in 1952.

Commodities not commercially produced in the United States or directly interchangeable with such commodities.

More than half of United States agricultural imports consist of products that mainly for climatic reasons are not produced commercially in the United States. They are not directly competitive with any of the products that constitute the sources of cash farm receipts. The major imports in this category are natural rubber, raw coffee, and cocoa, tea, carpet wool, bananas, tropical fibers, and certain spices. Exports of these commodities arise as a result of processing the imported raw materials.

TABLE 6.—*Trade in commodities not commercially produced in the United States nor directly interchangeable therewith, 1952*

[In million dollars]

Commodity group	Exports [1]	Imports [1]
Coffee	6	1,376
Raw rubber		622
Cacao and products (cocoa, etc.)	2	193
Sisal, henequen, abaca, etc.	1	112
Carpet wool		83
Raw silk		34
Bananas and plantains		56
Spices		51
Tea		40
Drugs and herbs		31
Essential and distilled oils		17
Total	9	2,616

[1] Including trade of United States territories with foreign countries but excluding shipments between the continental United States and these territories.

Cereal Production And Marketing in Turkey

by GIDEON HADARY

Turkey is today the fourth largest exporter of cereals in the Free World. In the main, these cereals are wheat and barley. The wheat is mostly a soft white variety similar to that grown in our Pacific Northwest.

Turkey's annual exportable surpluses of cereals exceed 2 million tons and are expected to expand, reaching 3 million to 4 million tons. Yet, in 1949-50 Turkey had to import cereals, and in 1951 the United States granted it $12 million for the procurement of wheat and flour.

This shift from importer to exporter is highly important to Turkey, for cereals are its most important single earner of foreign exchange, and the amount the country can sell governs to a large extent the rate of its development. Two basic factors affect Turkey's future cereal exports. One pertains to physical facilities; the other to price. It is with physical facilities that the United States aid of the past 3 years had been concerned. For price is of course a domestic matter.

Turkey's rapid increase in cereal production is due to the combination of exceptionally favorable weather and physical and institutional changes. Even with average or somewhat below average climatic conditions, however, production is likely to continue high. For the physical and institutional changes are making for a modern efficient agriculture.

Roads have been improved and expanded, largely through United States financing and technical assistance, and the number of cereal buying stations increased, bringing the crops nearer to market. In 1953 there were 311 cereal buying stations; in 1950 there were 242. The stations are now much more widely scattered and have a larger capacity, which together with the all-weather network of roads, provide a ready outlet for cash sale of grain. Thus, grains, historically produced mainly for use on the farm, are now becoming the most important cash crop of the Turkish farmer.

How great the physical change has been is dramatically told by a farmer of the Lake Van area when he said that under conditions prevailing in 1948 it would take more than 100 years to move to market the cereal crop he sold in 1953.

Another physical change affecting cereal production is the more abundant draft power and the stronger draft animals. More than 33,000 tractors and matching sets of equipment have been imported from the United States and Europe since 1948; 8,000 of the tractors were paid for by ECA/MSA (the United States aid programs). Draft animals are stronger because supplemental winter feeding is becoming more common as coarse grain production has increased. Heretofore, the animals, having had little supplemental feed, were so weak by spring that they were unable to pull a plow and had to be put on pasture. By the time they had regained their strength, however, much of the cultivating season had passed. Consequently, draft power was one of the most serious limiting factors insofar as area of production was concerned.

Many institutional changes have had an important effect on cereal production. The Turkish Government is committed to raising the standard of living of the farmers, who account for 80 percent of the population. As part of this policy, price supports for many agricultural commodities have been adopted. In the case of cereals, which contribute the bulk of farm income, the Government stands ready to buy all offerings at set prices. These prices are usually announced in the spring and are in effect for the following 12-month period. In the past 15 years, 10 to 30 percent of the cereal production has been purchased by Toprak Mahsulleri Ofisi (Soils Products Office) generally known as Toprak.[1] The Toprak purchase price in effect becomes the purchase price for all cereals sold in Turkey. While no cereal production costs are available for Turkey, and it is impossible to ascertain the margin of profit, most observers believe that the purchase price allows for a highly adequate return to the farmer.

Government purchase prices, increasing in recent years, have greatly stimulated production. An indication of the extent of the response of production to prices may be obtained from a comparison of the relative increase in wheat and barley acreage.

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[1]Toprak was established in 1938 to buy grains to support farm prices and to sell grain to prevent exorbitant rise in prices to consumers and to engage in foreign trade in grains. Toprak operates grain-handling installations and facilities. The capital for Toprak is provided wholly by the state, with any losses underwritten by the Turkish Central Bank, rather than the budget.

Great mounds of grain—hundreds of thousands of bushels of it—nearly cover the hillside near this grain-buying station in Turkey. Piling large quantities of grain in the open may soon be unnecessary in that country, for by this summer its grain-buying stations are scheduled to have facilities for storing more than 1½ million tons.

Wheat purchase prices have risen 35 percent since 1950, with a concurrent increase of 45 percent in area. Barley purchase prices rose only 18 percent in this period, with area going up 25 percent. The effect of prices is even more pronounced on the deliveries of the two crops to Toprak. Wheat deliveries to Toprak increased from 330,000 tons in 1950-51 to a record high of 1,230,000 tons in 1952-53, with purchases in 1953-54 reaching higher levels. Barley deliveries from 1950-51 to 1952-53 rose only from 132,000 to 192,000 tons and purchases to date from the 1953-54 crop are below those in the corresponding period in 1952-53.

Improved practices account for higher average yields—use of fertilizers and timely operations, for instance. But most important is the improved seed distribution program whereby better varieties of seed are made available by the state farms and other agencies of the Ministry of Agriculture. This seed is usually treated for disease resistance. In 1953, 3,150,500 acres—more than 10 percent of the total area seeded—benefited from the seed distribution program.[2]

Expansion of credit facilities has also contributed to increased production. The amount of loans extended by the Agricultural Bank increased substantially, and the terms have become much easier.

[2] Generally most of the seed used is heterogeneous: soft wheat is mixed with hard wheat, barley and rye are mixed with wheat, and all cereals have a high percentage of weeds. When the crop from this seed is harvested, it is generally threshed by animal-drawn sled, which adds dirt and foreign material.

An intangible factor affecting production is the new outlook of the Turkish farmer, who has come to regard his profession with pride in recent years. Greater spread of information through newspapers and radio, more widespread education, and appeal by the different political parties for support have contributed to the new outlook. All these, added to the profitability of farming, have given the Turkish farmer a greater inducement to produce.

These many changes have not yet had their full impact on production. It is anticipated, therefore, that the area of production will continue to expand. Output will depend on average yields, but they will undoubtedly increase as methods of cultivation improve and technological advances take place. It is hoped that the reorganization and expansion of the extension service, with the advice of American technical assistance personnel, will contribute.

The very substantial increases in cereal production have not been accompanied by a corresponding expansion in marketing and handling facilities, including storage.

The type and intensity of the problems caused by the disequilibrium are illustrated by what I saw on a trip through southern and southeast Turkey in March 1952 with Henry Wiens, at the time

TABLE 1.—*Cereal production in Turkey, average 1945–49, annual 1950–53*

Year	Area	Production
	1,000 hectares [1]	*1,000 metric tons*
1945–49	7,462	6,314
1950	8,244	7,764
1951	8,805	10,679
1952	9,911	12,291
1953	11,047	14,300

[1] A hectare equals 2.471 acres.

Deputy Chief of MSA Mission in Turkey (and now FOA Country Director in Iraq). We were most impressed by the enormity of the area of new land being brought under cultivation. Field after field was being broken up for the first time in centuries for cereal seeding. Cereal buying stations were greatly overtaxed. Toprak personnel in the buying stations were harassed in their effort to find places to store or bury all the grains delivered by farmers. Cereals were piled up in mounds and covered with tarpaulins. A large proportion of the crop was stored under dirt-straw cover; that is, the cereal was piled on the ground and then covered with a layer of straw, followed by a layer of dirt. Under optimum conditions grains can be stored like this for years, but when these piles are opened, straw and dirt are inevitably mixed in. This method of storage is satisfactory only when the soil has a high saline content and a low water level. Under other conditions, spoilage is high; in fact, we saw cereal literally too hot to touch. Sometimes the piles of cereals were not covered. We saw hundreds of thousands of bushels of wheat piled in the open with absolutely no protective cover. This wheat was completely green and had a thick layer of sprouting shoots over it. Toprak officials told us they were experimenting to determine the amount of spoilage resulting from open storage; that data were to be compared with the cost of other types of storage. Elsewhere wheat was in sacks torn by handling or rotting due to excessive exposure to rain.

We observed, too, how often grain was resacked. Farmers delivered it to the buying stations in sacks; there, it was resacked to load for transportation to the railroad cars, in which it was moved in bulk to the ports. Here, the grain was sacked again, then dumped for bulk storage in the port area. Finally, the grain was sacked for ship loading, with the sacks emptied on deck and returned. Each handling added holes to the sack as hooks were used to elevate them. Loading into ships was slow and wasteful. When the sacks were lifted with the ship's gear there was considerable spillage. Furthermore, it was impossible to load when it rained as the hold was completely exposed. In the ports we observed large quantities of cereal spoiling while awaiting shipment.

This trip reaffirmed our conviction of the need to provide emergency storage for the expanding production, and to facilitate movement in and through the ports. Meetings were held with the Director General of Toprak and other government officials. As a result of these meetings the Turks developed a grain program, consisting of an emergency project to be implemented immediately and projects to be implemented in succeeding years. The emergency project was submitted to MSA for consideration and approved for financing in record time. Since 1951-52 the United States has contributed substantial amounts of grant-aid funds to Turkey for developing grain-handling facilities, as part of an overall plan to expand marketing facilities so as to more nearly correspond with the productive capacity.

Within less than a year after the financing was made available, storage space for 455,000 tons of grain had been added and Turkey had procured with its own resources pneumatic handling equipment for mechanical cleaning, weighing, and loading in ports.

The inadequacy in the marketing sector was especially acute for exporting cereals. When Turkey began to offer substantial quantities of cereals for export in 1952, facilities did not permit export at a rapid rate and the grain was not properly graded and standardized. These factors were considered in the planning of the 1952-53 MSA program. An amount of $9 million was allocated and used to procure 60 steel grain elevators (with

Grain is weighed in at a Government buying station in Turkey. Grain production in that country has nearly doubled in the past 3 years.

2,000-, 4,000-, and 6,000-ton capacity) for inland use, two 10,000-ton steel elevators—one each for the ports of Mersin and Samsun—and various cleaning, weighing, and other handling equipment. In about 6 months after the final contracts were placed nearly all the steel elevators had arrived in Turkey, ready to install; erection is planned for the spring and summer of 1954. At the insistence of the FOA (Foreign Operations Administration) Country Mission the suppliers of the equipment were required to provide engineering services in connection with the installation and to train the Turks in the operation and use of the equipment after the installation. When all these facilities have been installed, Toprak will have a total storage capacity of 1,612,000 tons, and a handling capacity of about 2,000,000 tons per year, assuming maximum utilization of equipment and facilities throughout the year. Total investment from all sources in grain-handling storage and movement facilities to date is estimated at 40,000,000.

Even after all the equipment and facilities programmed with 1952-53 aid funds will have been installed, the principle impediment to regular export deliveries will continue to be lack of standardization and the inadequacy of the pipeline from the buying stations through the ports.

Plans now underway call for additional investment designed mainly to expand and improve port grain-handling facilities and to improve the quality of cereals through better threshing, cleaning, grading, etc., and to provide additional mechanized storage to permit bulk handling of the increased crop.

Sacks of grain are carried by lighter to a ship, docked a mile from shore in the port of Mersin. This means of loading is often resorted to in Turkey, where facilities for loading directly are inadequate.

Turkish Government officials inspect materials for grain storages, ready for shipment from the United States.

Rabbits, Myxomatosis, And Wool in Australia

The virus disease, myxomatosis, was introduced into Australia a few years ago to help the sheepman control his No. 1 pest, the rabbit.

by THOMAS C. M. ROBINSON

To the American farm boy the rabbit is small game, to be zestfully hunted. To the French peasant or villager it is a very efficient converter of garden waste into meat. To the Italian hatter it is the producer of most of the fur from which the hat industry obtains its felt.

But to the Australian wool grower, the rabbit is the greatest of all curses, ranking ahead of drought as a reducer of income. Why is it that the rabbit is cast in a villian's role "Down Under," when in Europe and North America it enjoys the affection, or at least the indulgence, of both the juvenile and adult populations?

In Europe and North America, so far as modern man is concerned, rabbits have "always been there." Various species are native to Europe, and others to North America. As a result, rabbits have ordinarily been in balance with their environments. Predatory birds such as hawks and owls and predatory mammals such as foxes, wolves, and weasels have held rabbit numbers in check, and, as the increasing human population has resulted in a reduction in the number of predators, man himself has become an important predator on the rabbit.

In Australia, however, rabbits are migrants, relatively recently introduced for sport into an environment that had developed without them and was thus not fitted to hold them in check. It must be remembered that when European settlement of Australia began 165 years ago Australia's mammalian population consisted almost entirely of marsupials. Because of Australia's relatively early isolation from all other large land masses, none of the higher forms of mammalian life reached the island continent until the wild dog, or dingo, was introduced by the aborigines some time within the past few thousand years.

The rabbit, released in temperate and subtropical Australia, multiplied beyond all imagining, upsetting the ecological balance over a greater area than any other creature save man himself. There were few predators to hold the rabbit in check. (The most effective predator, the dingo, has been fairly well controlled throughout all of the sheep raising areas because of the sheep and lambs it kills.) The mild climate permitted breeding all year round. There was little hunting of rabbits for food because of the sparsity of human population and the extremely low price of mutton. The result was that well before the end of the nineteenth century rabbits had developed into Australia's No. 1 pest, competing on better-than-even terms with sheep for the limited supply of grass and herbage, particularly in time of drought.

The reaction of the Australian wool producers to this threat to their profitable existence was vigorous and varied. A rabbit-proof fence hundreds of miles long was built along the eastern edge of the pastoral areas of Western Australia from the Southern Ocean north to the Tropics. In the rest of Australia, virtually all sheep stations were completely surrounded by rabbit-proof fences, and many were subdivided with such fences. (A rabbit-proof fence normally consists of 1¼ inch mesh chicken netting of 17-gage wire, buried in the ground to a depth of 6 inches and rising to a height of 3 feet, with a heavy plain wire reinforcing it at the ground, half way up, and at the top; above the netting is another plain wire topped by a barbed wire.)

Streams posed special problems, only partly solved by swinging barriers; and gates were largely replaced by vehicular grids across which rabbits will not pass. The netting of a property, to be effective, had of course to be accompanied by the extermination by means of dogs, shooting, traps, suffocation,

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or poison, of all rabbits within the property or paddock. The fences had then to be maintained in a rabbit-proof condition, which was and is a continuing and expensive task. Every two or three decades the fences must be replaced. A well managed sheep station of any size normally has several rabbiters at work, with dogs, poisons, and traps. And it usually has tractor-mounted rippers used to plow in the warrens, suffocating the rabbits inside.

Despite all of these methods of control, rabbits remained a major menace, restricting the amount of feed available for sheep and thus reducing each year's wool clip by millions of pounds in value. They remained so because some landowners were not energetic and vigilant; their properties were so overrun by rabbits that most of the grass and herbage were killed, resulting in accelerated erosion. Too, some land, so rough and rocky as to be of little value for grazing, furnished ideal sites for warrens, which could be dug out only with difficulty. And crown lands, either in forests or unoccupied, in stock routes or along railways, were not normally managed with aggressive rabbit control in mind. All these classes of land became rabbit reservoirs from which the animals poured over, under, and through the fences into the sheep stations. Large cash prizes for effective methods of rabbit extermination were offered, but even the great Pasteur, who suggested a tentative solution, was not successful. It appeared that the rabbit was there to stay.

It was only natural that rabbiters came to regard the rabbit as not altogether a curse. In addition to drawing their wages or bounties for killing rabbits, they skinned the carcasses and derived considerable income from the sale of pelts. They also sold the carcasses to plants that had been set up to freeze the carcasses for export to the United Kingdom and elsewhere as well as for sale on the domestic market. Human nature being what it is, there is more than a suspicion that rabbiters were often careful not to kill off all the rabbits on a station or in a paddock, leaving a few for "seed." This habit merely aggravated the existing problem and made its solution more difficult.

In 1926 the New South Wales Department of Agriculture obtained from Brazil the virus of a disease called myxomatosis, which had been discovered among laboratory rabbits in South America about 1897. Laboratory experiments were conducted

Rabbits are inoculated with the virus, myxomatosis, in Australia's campaign to kill off the sheepman's most damaging pest.

with the virus, but the question whether or not the virus would be safe to liberate in the field was not answered. Further experiments were started by the Council of Scientific and Industrial Research (now the Commonwealth Scientific and Industrial Research Organization) at Cambridge, England, in 1933 and later transferred to Australia. The lethal effect of the virus on both domestic and wild forms of the European rabbit (*Oryctolagus cuniculus*) was already known, and it was soon found that all of the common domestic animals and all of the native Australian fauna were completely immune, as was man. It was known that the disease was essentially insect borne (it may also be transmitted by direct contact with an infected rabbit), but few of the possible insect vectors had been identified. Field trials of the virus in isolated localities showed that fleas and at least four species of mosquitoes could act as carriers, while foxes, probably by selectively killing off sick rabbits, could prevent the establishment and spread of the disease.

By the winter of 1950 the serious rabbit situation had led the C.S.I.R.O. to carry out further field trials in areas where mosquitoes were likely to be plentiful; virus-inoculated rabbits were liberated on seven different occasions between May and November at five different sites in the Murray Valley. Initial results were disappointing; the disease appeared to die down everywhere with no appreciable effect on the rabbit population. Early in December, however, it flared up at many spots

along the Murray as well as on the tributaries, one of the first outbreaks being on the Darling about 400 miles from the closest liberation site. Obviously, mosquitoes had spread the disease. The epizootic gathered momentum rapidly during January and February of 1951, and by autumn had spread down the Murray to its mouth, up all the major tributaries almost to their sources, and up the Darling and its branches into southern Queensland as well as into the Channel Country. The total area in which the disease had appeared was about 1,000 miles from north to south and 1,100 miles from east to west. It was obvious from the kill pattern within that area, however, that the spread of the disease depended on the presence in large numbers of certain insect vectors, primarily mosquitoes, about the behaviour of which little was known.

The disease smouldered through the winter of 1951, then flared with renewed intensity during the summer of 1951-52, aided by the distribution of the virus to hundreds of districts and the inoculation of healthy rabbits, which were then either released or exposed to mosquito bites in cages. Transfer of the virus from diseased to healthy rabbits was accomplished either by means of a hypodermic syringe or by direct transfer by means of a swab of pus from the eye. Virtually complete (99.5 percent) kills were obtained in many districts, and rabbits almost disappeared from such localities. Apparently many landowners believed that their rabbit problem had been solved, although the C.S.I.R.O., State Departments of Agriculture, Pasture Protection Boards, and Graziers' Associations all warned that complete eradication of the rabbit would not be achieved by myxomatosis, but that the greatly reduced numbers furnished an opportunity, perhaps never to be achieved again, for the few remaining rabbits to be exterminated by conventional methods.

In 1951-52 a combination of greatly reduced rabbit population, favorable rainfall, and increased area in improved pastures resulted in a major increase in feed available from pastures. Consequently, the 1952-53 wool clip was by far the largest on record, with the average fleece weight per sheep reaching 9.2 pounds, 12 percent larger than in the preceding season and 0.5 pound larger than in the next highest year since the war. Myxomatosis alone is estimated by the Australian Bureau of Agricultural Economics to have added 70 million pounds of wool worth about $54 million to the wool clip, while the increase in sheep and lamb slaughter due to the same cause was worth about $22 million, making a total gain of $76 million for the year.

Early in the summer of 1952-53 it became apparent, however, that something had gone wrong. More and more rabbits were recovering from myxomatosis, and it was apparent to even the most sanguine that the disease was losing some of its effectiveness. The C.S.I.R.O. began experiments, the results of which have not yet been announced, to determine whether the reduced killing power of the disease was due to (1) an alteration of the virus which made it less lethal to rabbits, (2) a temporary immunity on the part of rabbit kits being suckled by recovered rabbits, or (3) the rapid breeding up of the few rabbits that had had a hereditary resistance to the virus. It is rumored that the virus still kills 99.5 percent of inoculated laboratory rabbits, so the disease is probably no less lethal. Experience thus far during the 1953-54 summer indicates that the process of accommodation between the virus and the rabbit, whatever its mechanism, has gone to the point where a sizable fraction, perhaps 10 percent overall, of the rabbits contracting the disease are recovering from it.

Of considerable significance this year, and of probable significance in many future years, is the fact that dry weather reduces the number of mosquito carriers and therefore the incidence of the disease, whatever the percent mortality may be. Furthermore, with a reduced rabbit population it is farther between rabbits, and a smaller percentage of the rabbit-biting insects will be carrying the virus.

Whether the C.S.I.R.O. will be able to discover or develop other strains of the myxomatosis virus to which rabbits now resistant to the prevailing strains will prove susceptible, only time can tell. It seems improbable, however, that myxomatosis will ever completely annihilate Australia's rabbits, and the wire netting fence, the rabbiter and his dogs, and the rabbit freezing plant will probably continue to be common sights throughout temperate and subtropical Australia. This means, of course, that some reduction of wool clips due to rabbit-denuded pastures can be expected to occur in future years as in the past, although closer settlement, together with myxomatosis and all of the other weapons in use against the rabbit, should result in a gradual, if not steady, reduction in rabbit numbers and damage.

The Smallholdings of Denmark

By RALPH S. YOHE

Ejnar Jörgensen is a "husmand." Husmand is the Danish word for a special type of small landholder that came into existence through a series of Danish laws dating from 1899, which were passed by the parliament to improve the economic and social lot of agricultural workers. Literally translated, the word means "house man," the old Danish term for a farm worker.

Forty-year-old Ejnar Jörgensen plans his own cropping system and what he will or will not produce, but he does not own his land. He owns only his farm buildings.

Under the law the government keeps the legal title to the land, and Jörgensen pays an average of 4 percent interest a year for the use of it, the rate depending on the price of the most important products he sells—butterfat, bacon, and barley. Every 4 years the land is revaluated. When Jörgensen first began farming, his farm was valued at $1,200; today it is valued at $2,300.

The Jörgensen family began farming in 1936. Before that the land had been part of a larger farm. The government, under the smallholding laws, had bought the farm on the open market and then had divided it into three farms. To get his farm, Jörgensen had to apply to the Committee on Land Settlement, which determined whether he had the qualifications required by law for smallholders.

The government loaned him nearly 90 percent of the money needed to build his house and barn and to buy his livestock and farming equipment. He did not have to pay any interest for the first 3 years; since then he has paid from 2 to 6 percent, depending again on the price of agricultural products. Jörgensen's farm—about 19 acres—is small by American standards, but it is about the average size of the smallholdings on good land in Denmark.

It was raining when I arrived at the Jörgensen farm, and we ventured out only a short distance into the small fields.

Back in the barn, Jörgensen told me that he used an 8-year rotation: oats, wheat, mangels, barley, mangels, barley with a catch crop of grass and clover, and 2 years of pasture or hay. Smallholders in Denmark, faced with the problem of making their limited acreage produce feed for their livestock, generally grow more root crops than do larger farmers, for these crops give more feed per acre than other crops. The larger Danish farmer raises more grain and crops that can be sold.

Since every acre must count, the smallholder uses an average of 600 to 700 pounds of commercial fertilizer per acre per year.

In the barn we looked at the 8 Red Dane milk cows and 7 heifers that make up the dairy herd. The milk cows last year gave an average of 12,650 pounds of milk. The average for cows under herd testing in Denmark last year was 8,580 pounds. Milk yields for very small herds in Denmark run high.

At the end of the cow barn was an adjoining hog-house. The Jörgensens buy from 50 to 60 feeder pigs each year and feed them on skim milk, barley, sugar beets, and protein meal. The pigs are marketed at about 200 pounds, the size the Danish bacon plants like for the export market.

The number of pigs or dairy cows that is kept on a small farm is quite small, but in terms of animals per acre it is much higher than the number kept on the larger farms. Likewise, the yields of pasture and hay per acre may run twice as much as those of the larger Danish farms. For the small farmers have had to turn to more intensive types of farming. But even though their yields are high and they grow high-yielding crops like roots, they still must buy large amounts of grain to feed their livestock.

Jörgensen has only a small flock of hens, but on other small farms I found anywhere from 200 to 500 laying hens. Some farmers kept even more. Other small farmers keep more hogs to increase the size of their farm business.

Near the Jörgensen's barn was a high-roofed shed bulging with neatly stacked piles of sheaves of barley and rye. During the winter the family threshes the grain in a small stationary thresher run by an electric motor. This helps the family spread out their labor, for all the farm work is done by the family itself.

In a stall stood two red roan horses. Mechanization proves a big problem to the small farmers, who do not have enough land to keep a normal-size tractor busy, let alone to profitably use specialized machinery on their small fields. Some small farmers have joined to buy a tractor. But, for them, of course, there is the problem as to who will use the tractor first in the busy season.

In the attractive small cottage I talked with the rest of the Jörgensen family.

"We do not make a big profit," Mrs. Jörgensen told me, "but we have a comfortable living. Certainly as good as we would have working for someone else or in the factory. It is true that we work long hours, but we are our own boss.

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It is the same story that many a farm family in America has told me.

If Jörgensen wishes to quit farming, however, he may sell his holdings to a man who will himself run the farm. If he wishes to pass the farm on to his son, he may do that too. But if he should transfer it to someone else, the government has the right to step in and buy the farm for the cost of the buildings plus the value of any other improvements that the owner has made. Jörgensen may also mortgage the farm, but not for more money than the total loan the government made to him for the buildings and improvements.

Some smallholders in Denmark do own their own land. Land titles to farms developed under the smallholdings law before 1919 were turned over to the farmers themselves. And even today, under certain conditions, a small farmer can get government loans to buy land.

Most visitors to Denmark look on the government-sponsored smallholdings either as a "great social institution" or as a "starry-eyed scheme" that divides large, efficiently run estates into small, noneconomical units. And there is no doubt that small farms are the curse of most of Europe.

Denmark is a small country; if you jammed all of its islands and mainland together, they would barely fill Lake Michigan. And Denmark has a large population; it has more than half again as many people as the State of Indiana. But despite its small farms, its small size, and its large population, Denmark exports 83 percent of its butter, 54 percent of its bacon, and 75 percent of its eggs. Before the war more than 70 percent of its exports were farm products.

So it can easily be seen that agriculture has played an important role in Denmark's economy. As the number of its people has increased and its industry and trade have developed, Denmark has made more and more intensive use of its land to give more employment to its people and to produce more agricultural goods to trade for industrial goods.

It was Denmark's desire to keep people gainfully employed on the land with a reasonable income, and to encourage farm ownership among as many farm people as possible, and it was its need to get the most out of the soil that led Denmark late in the 19th century to lay the groundwork for government-sponsored smallholdings.

Whether smallholdings are to continue to have a useful place in Denmark's economy depends principally on the answers to two questions. First, will the smallholder be able to compete successfully with other agricultural producers at home and abroad? Second, if Denmark continues its industrial development, will the smallholder be able to keep pace with the industrial worker in his standard of living? He may be willing to sacrifice some income for the security of the farm, but there will be a limit as to how far he will be willing to trade wages for security.

Beet tops are unloaded into a silo on this small Danish farm. Root crops are popular with the small farmer of Denmark, for with those his few acres yield high returns in feed for his livestock.

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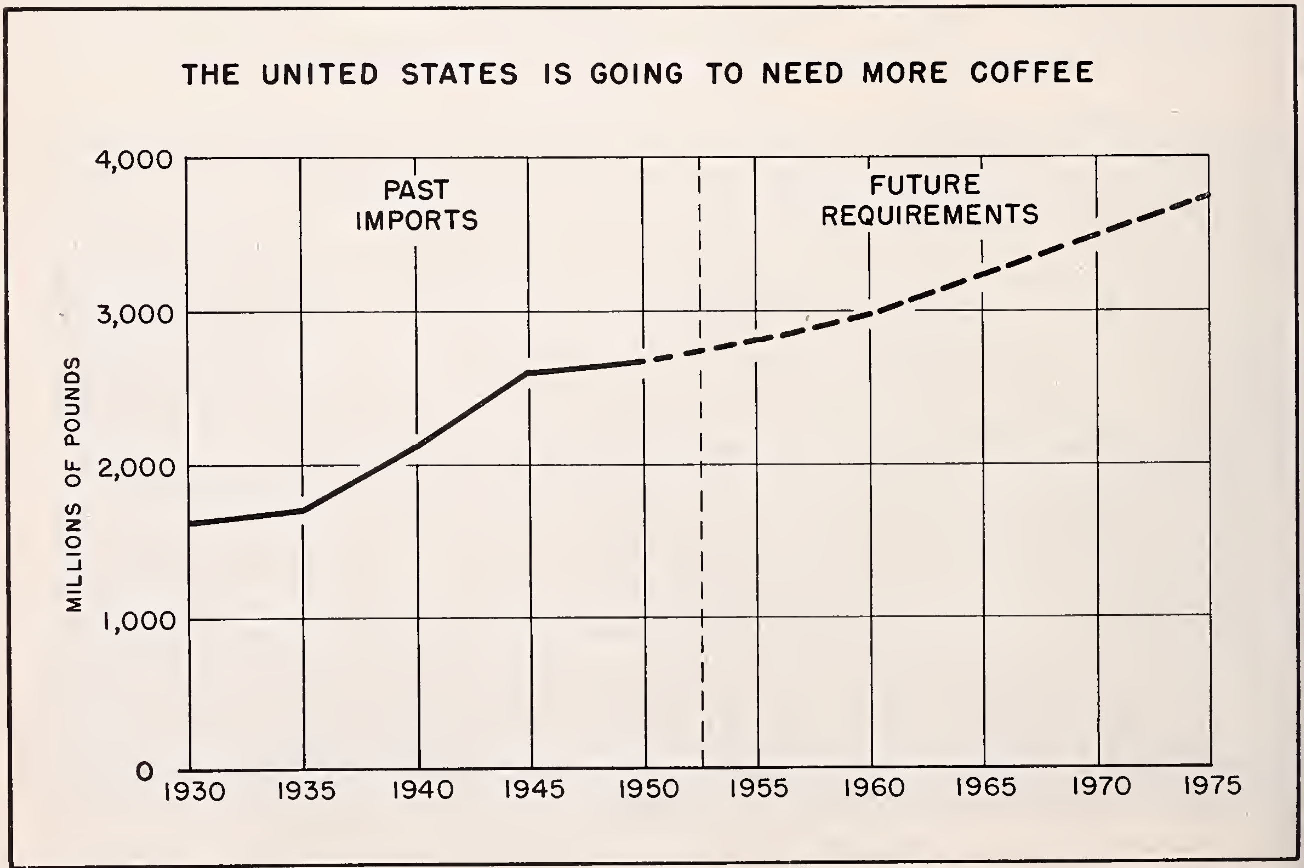

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